IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

LERCHL et al Atty. Ref.: **3557-11**

Serial No. **10/088,027** Group:

National Phase of: **PCT/EP00/09245**
International Filing Date: **21 September 2000**

Filed: **March 14, 2002** Examiner:

For: **GMP SYNTHETASE DERIVED FROM PLANTS**

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August 12, 2002

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

SUBMISSION

Submitted herewith is an English translation of the International Preliminary Examination Report received in connection with PCT/EP00/09245.

Respectfully submitted,
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PCT

NOTIFICATION OF TRANSMITTAL OF COPIES OF TRANSLATION OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 72.2)

To:

BASF AKTIENGESELLSCHAFT
67056 Ludwigshafen
ALLEMAGNE

AST

Date of mailing (day/month/year)	
22 May 2002 (22.05.02)	
Applicant's or agent's file reference	**IMPORTANT NOTIFICATION**
0050/050777	
International application No.	**International filing date (day/month/year)**
PCT/EP00/09245	21 September 2000 (21.09.00)
Applicant	
BASF AKTIENGESELLSCHAFT et al	

1. Transmittal of the translation to the applicant.

The International Bureau transmits herewith a copy of the English translation made by the International Bureau of the international preliminary examination report established by the International Preliminary Examining Authority.

2. Transmittal of the copy of the translation to the elected Offices.

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The applicant is reminded that, where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report.

It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned (Rule 74.1). See Volume II of the PCT Applicant's Guide for further details.

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Translation

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 0050/050777	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/EP00/09245	International filing date (*day/month/year*) 21 September 2000 (21.09.00)	Priority date (*day/month/year*) 01 October 1999 (01.10.99)

International Patent Classification (IPC) or national classification and IPC
C12N 15/82

Applicant
BASF AKTIENGESELLSCHAFT

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

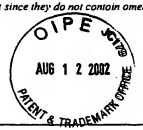
Date of submission of the demand	Date of completion of this report
21 April 2001 (21.04.01)	06 February 2002 (06.02.2002)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/EP00/09245

I. Basis of the report

1. This report has been drawn on the basis of (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):



☒ the international application as originally filed.

☐ the description, pages 1-25, as originally filed,
pages _____, filed with the demand,
pages _____, filed with the letter of _____,
pages _____, filed with the letter of _____.

☐ the claims, Nos. 1,3-16, as originally filed,
Nos. _____, as amended under Article 19,
Nos. _____, filed with the demand,
Nos. 2, filed with the letter of 21 December 2001 (21.12.2001),
Nos. _____, filed with the letter of _____.

☐ the drawings, sheets/fig 1/4-4/4, as originally filed,
sheets/fig _____, filed with the demand,
sheets/fig _____, filed with the letter of _____,
sheets/fig _____, filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/fig _____

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: III.1

Claim 16 is unclear to such an extent that no opinion can be established (PCT Article 6). The "compound" mentioned in the method described is characterized only by functional criteria. It therefore cannot be determined whether the above claim would also encompass known methods for eliminating plant growth.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-12	YES
	Claims		NO
Inventive step (IS)	Claims	7, 11, 12	YES
	Claims	1-6, 8, 9, 10	NO
Industrial applicability (IA)	Claims	1-12	YES
	Claims		NO

2. Citations and explanations

This report makes reference to the following documents:

D1: DATABASE EMBL [Online] ACCESSION NO: F14426, 20 July 1995 (1995-07-20) MORRIS, P.C., ET AL.: 'A. thaliana transcribed sequence; clone YAY969; 3' end; similar to GMP Synthase; Saccharomyces cerevisiae.' XP002167639

D6: US-A-5 780 254 (SUBRAMANIAN VENKITESWARAN ET AL), 14 July 1998 (1998-07-14)

D7: US-A-5 780 253 (SUBRAMANIAN VENKITESWARAN ET AL), 14 July 1998 (1998-07-14)

D8: WO-A-95/27789 (SYNTEX INC), 19 October 1995 (1995-10-19)

D9: WO-A-98/10074 (BASF AG; LERCHL JENS (DE); SONNEWALD UWE (DE); BADUR RALF (DE); SC), 12 March 1998 (1998-03-12).

1. Inventive step (PCT Article 33(3))

1.1 Document D1 was identified as closest prior art with respect to the subject matter of present Claim 1. The present application differs from D1 in that its object is to provide a complete coding sequence of a GMP synthetase

from other plants (*Nicotiana tabacum* and *Physcomitrella patens*).

Document D1 states that its partial sequence from *Arabidopsis thaliana* is similar to a GMP synthetase from *S. cerevisiae*. In the prior art GMP synthetases are referred to as targets for herbicidal action (see, for example, D6: column 3, lines 58 and 59; D7: column 1, lines 51-55; D9: page 1, lines 41-42 and Figure 1). For a person skilled in the art this teaching would be sufficient motivation to determine the full sequence of the clone described in D1 and, with the aid of known methods (e.g. PCR, library screening), use same also to isolate coding sequences for GMP synthetases from other plants. In view of the prior art a person skilled in the art could reasonably have expected to be successful in his attempt.

The expression of such a sequence in prokaryotic or eukaryotic cells (Claim 6) with the aim of synthesizing a plant GMP synthetase likewise represents routine practice and hence cannot substantiate an inventive step.

The use of recombinant GMP synthetases in activity tests for the identification of inhibitors is likewise known in the prior art (e.g. D8: Screening for inhibitors of human GMP-synthetase, Examples 5 and 6).

Claims 1-6, 8 and 9 are therefore not inventive with respect to D1, combined with D6, D7, D8 or D9 (PCT Article 33(3)).

1.2 Claim 10 discloses a method for identifying substances with herbicidal action which inhibit GMP synthetase activity in plants. However, Claim 10 is not

restricted to the sequences described in the application or variants thereof, but relates generally to a "DNA sequence coding for an enzyme with GMP synthetase activity". This represents a purely conceptual wording of a screening method for GMP synthetase inhibitors with herbicidal action.

D9 describes the production of transgenic plants which overexpress the enzyme adenylosuccinate synthetase (ADSS). This overexpression results in resistance of the transgenic plants to ADSS inhibitors (page 9, line 45, to page 10, line 6). It is therefore obvious that such transgenic plants can also be used as negative controls in screening methods for identifying new inhibitors. D9 also points out that "some of the enzymes involved in purine biosynthesis [...] constitute potential points of attack for herbicidal substances" (page 1, lines 41 and 42).

The concept of overexpression of purine biosynthesis enzymes for the identification of inhibitors is therefore obvious and can consequently not be considered inventive.

Claim 10 is not inventive with respect to D9 (PCT Article 33(3)).

Moreover, Claim 10 is not sufficiently disclosed and supported by the description (PCT Articles 5 and 6). The present application discloses only methods based on the identified GMP synthetases but does not contain a basis for extension to all "DNA sequences coding for an enzyme with GMP synthetase action".

1.3 Claims 7, 11 and 12 relate to uses of the GMP synthetases identified in the application for the identification of inhibitors of said enzyme having a

herbicidal action.

Although the provision of the nucleotide or amino acid sequence of a plant GMP synthetase cannot be considered inventive per se (see 1.1), it was not obvious to use this sequence for the identification of GMP inhibitors with herbicidal action.

D6 and D7 disclose a method for identifying herbicides with targeted inhibition of GMP biosynthesis (D6 and D7, EXAMPLE 3). However, they do not clearly demonstrate the effect of the inhibitor mycophenolate on GMP synthase because two enzymes, that is IMP-dehydrogenase and GMP synthase, are potential targets of inhibition. It is therefore not obvious to a person skilled in the art that GMP synthetase is a suitable target for herbicides.

D9 likewise mentions GMP synthetase only in connection with other enzymes of purine biosynthesis without indicating which of these enzymes (apart from ADSS, whose suitability is demonstrated) would be especially suitable as herbicide target.

Claims 7, 11 and 12 are inventive (PCT Article 33(3)).